

REMARKS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 1-26 are pending in this application. Claims 10-17 have been withdrawn from consideration. Claim 26 has been added. Claim 26 corresponds to claim 1 amended as suggested by the Examiner. Therefore, Applicant submits that claim 26 is patentable.

Applicant is pleased to note the Examiner indicated that claim 21 would be allowable if rewritten to overcome § 112, second paragraph, and to include all the limitations of the base claim and any intervening claims. Applicant has amended claim 21 and thus Applicant submit that claim 21 is in form for allowance.

Claim Rejections – 35 U.S.C. § 112

Claims 1-9 and 18-25 have been rejected under 35 U.S.C. § 112, second paragraph.

The Examiner contends that the limitation “by heating at least one of the slot electrode and component parts including the wavelength reducing member above a lower temperature limit and cooling at least one of the slot electrode and component parts including the wavelength reducing member below a higher temperature limit,” is vague. The Examiner interprets the limitation to include two separate systems: a heating device and a cooling device. Applicant respectfully disagrees.

Claim 1 is perfectly clear. One of ordinary skill in the art would understand the scope of the claim. Indeed, the first temperature device can perform both functions of heating and cooling. It is not necessary for a device to have two distinct devices to perform two distinct functions. MPEP 2173.04 states the breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if Applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

The Applicant is not only limited to claiming the best mode of the invention but Applicant can claim the subject matter that Applicant regards as is his invention.

Accordingly, the Applicant respectfully submits that the pending claims are in full compliance with 35 U.S.C. § 112 and respectfully requests that the rejection of claims 1-9 and 18-25 under § 112, second paragraph be withdrawn.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 2, and 4-7 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ishii *et al.* (U.S. Pat. No. 5,698,036) in view of Orezyk *et al.* (US Pat. No. 5,937,323). The Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner contends that Ishii *et al.* discloses (referring to Figures 14-19, col. 11, line 46 through col. 12, line 67, and col. 14, line 60 through col. 15, line 13) a microwave plasma processing apparatus comprising the elements recited in claim 1 and in particular cooling fins 84 (first temperature control device), cooling fans, or cooling jacket may be used to cool the flat antenna member 44, dielectric material 80, and dielectric accommodating portion 82a. The Examiner admits that Ishii *et al.* fails to teach heating and cooling at least one of the slot electrode and component parts including the wavelength reducing member. The Examiner, however, contends that Orezyk *et al.* teaches a temperature control plate including a cold plate 24 and heater plate 23 which are provided on dome 14 (dielectric) and the top coil (electrode) to control the temperature of the dome at a specific range and thus it would have been obvious to one of skill in the art to provide the slot electrode and wavelength reducing member of Ishii *et al.* with the temperature control plate as taught by Orezyk *et al.* Applicant respectfully disagrees.

As conceded by the Examiner, Ishii *et al.* fails to teach heating and cooling at least one of the slot electrode and component parts including the wavelength reducing member.

With regard to Orezyk *et al.*, this reference merely teaches a plasma vapor deposition system 10 including a chamber 13 which has a dome 14 (dielectric). A heater plate 23 and a cold plate 24 surmount and are thermally coupled to dome 14 to control the dome temperature (see, col. 4, line 66 to col. 5, line 2). Orezyk *et al.*, however, does not disclose, teach or suggest a slot electrode or a wavelength reducing member much less a temperature control device constructed and arranged to control a temperature of at least one of the slot electrode and component parts including the wavelength reducing member. The top coil 29 which the Examiner characterizes as “the electrode” is not equivalent to the slot electrode recited in claim 1. Indeed, the slot electrode recited in claim 1 is provided to guide the

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microwave exiting the wavelength reducing member. Moreover, Orezyk *et al.* merely controls the temperature of the dome to allow performing cleaning or etching processes at high temperature or to reduce flake or particle counts in the chamber. Therefore, there is no suggestion in either Orezyk *et al.* or in Ishii *et al.* to provide the slot electrode and wavelength reducing member with the heater plate 23 and cold plate 24 of Orezyk *et al.*

In addition, there is no motivation to replace the cooling fins of Ishii *et al.* with the heater plate and cold plate of Orezyk *et al.* because in Ishii *et al.* the cooling fins 84 are merely used to cool the flat antenna member 44 “to prevent the flat antenna from deteriorating” and in Orezyk *et al.* the heater plate 23 and cold plate 24 are provided for a different purpose (for etching or to reduce flake particles in the chamber). Whereas, the first temperature controller recited in claim 1, maintains the temperature above a lower temperature limit which allows, for example, to eliminate influence of water on a substrate during processing (see, for example, page 4 of the specification).

Consequently, neither Ishii *et al.* nor Orezyk *et al.* disclose, teach or suggest, alone or in combination, a first temperature control device constructed and arranged to control a temperature of at least one of the slot electrode and component parts including the wavelength reducing member provided in the vicinity of the slot electrode within a predetermined range of temperatures by heating at least one of the slot electrode and component parts including the wavelength reducing member above a lower temperature limit and cooling at least one of the slot electrode and component parts including the wavelength reducing member below a higher temperature limit.

Therefore, the Applicant respectfully submits that claim 1, and claims 2, 4-7 which are dependent therefrom, are patentable and respectfully requests that the § 103(a) rejection of claims 1, 2 and 4-7 be withdrawn.

Claim 3 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ishii *et al.* in view of Orezyk *et al.* The Applicant respectfully traverses this rejection for at least the following reasons.

Claim 3 is indirectly dependent from patentable claim 1. Therefore, for at least the reasons provided above in claim 1, Applicant respectfully submits that claim 3 is patentable. Moreover, contrary to Examiner’s contention, Applicant submits that discovering the temperature range (between 60°C and 80°C) is not obvious because neither Ishii *et al.* nor Orezyk *et al.* disclose, teach or suggest a temperature range between 60°C and 80°C. Indeed,

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Ishii *et al.* merely teaches cooling the flat antenna to prevent deterioration of the flat antenna and Orezyk *et al.* controls the dome temperature for completely different reasons, i.e., for cleaning and etching or reducing flake or particle counts. Furthermore, Orezyk *et al.* controls the dome temperature in a range of temperatures (between 100°C to 200°C) which is outside the range of temperatures claimed in claim 3. Consequently, neither Ishii *et al.* nor Orezyk *et al.* disclose, teach or suggest, alone or in combination, the subject matter recited in claim 3.

Therefore, the Applicant respectfully submits that claim 3 is patentable and respectfully requests that the § 103(a) rejection of claim 3 be withdrawn.

Claims 8 and 9 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ishii *et al.* in view of Orezyk *et al.* as applied to claims 1, 2, and 4-7 above, and further in view of Trow *et al.* (US pat. No. 5,824,607). The Applicant respectfully traverses this rejection for at least the following reasons.

Claims 8 and 9 are directly or indirectly dependent from patentable claim 1. Therefore, for at least the reasons provided above in claim 1, Applicant respectfully submits that claims 8 and 9 are patentable. Thus, Applicant respectfully requests that the § 103(a) rejection of claims 8 and 9 be withdrawn.

Claims 18-20 and 22 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ishii *et al.* in view of Orezyk *et al.* as applied to claims 1, 2 and 4-7 above, and further in view of Fujimoto *et al.* (Japanese Patent Publication 01-072526). The Applicant respectfully traverses this rejection for at least the following reasons.

Claims 18-20 and 22 are dependent directly or indirectly from patentable claim 1. Therefore, for at least the reasons provided above in claim 1, Applicant respectfully submits that claims 18-20 and 22 are patentable. Thus, Applicant respectfully requests that the § 103(a) rejection of claims 18-20 and 22 be withdrawn.

Claims 23-25 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ishii *et al.* in view of Orezyk *et al.* and further in view of Shirasago *et al.* (Japanese Patent Publication 02-197575). The Applicant respectfully traverses this rejection for at least the following reasons.

Claims 23-25 are dependent directly or indirectly from patentable claim 1. Therefore, for at least the reasons provided above in claim 1, Applicant respectfully submits that claims 23-25 are patentable.

Moreover, the Examiner concedes that Ishii *et al.* in view of Orezyk *et al.* fails to teach a fluid controller with a fluid flowing to a temperature control plate. The Examiner contends that Shirasago *et al.* teaches an electrode 110 provided with a pipe 1102 for flowing a fluid. The temperature of the fluid is measured using thermocouple 1101 and controlled by a temperature controller 1103. A feeder 1104 (mass flow controller and stop valve) regulates the feed rate of the fluid inside the pipe. Thus, it would have been obvious to one of ordinary skill in the art to provide the temperature control plate of Ishii *et al.* in view of Orezyk *et al.* with a fluid controller as taught by Shirasago *et al.* The Applicant respectfully disagrees.

Applicant reiterates the arguments filed March 11, 2003. Specifically, Shirasago *et al.* merely shows a pipe 1102 wound in spiral conformation inside hollow electrode 110 (electrode 110 has a cylindrical shape, see the Figures in Shirasago *et al.*) The electrode 110 in Shirasago *et al.* is not a plate. Thus, Shirasago *et al.* spiral pipe 1102 cannot be introduced into a plate conformation of the antenna member 44 of Ishii *et al.* or the cold plate 24 and heater plate 23 of Orezyk *et al.* Therefore, Shirasago *et al.* cannot be combined with either Ishii *et al.* or Orezyk *et al.*

Consequently, Ishii *et al.*, Orezyk *et al.* and Shirasago *et al.* do not disclose, teach or suggest, alone or in combination, the subject matter recited in claim 23.

Therefore, the Applicant respectfully submits that claims 23 and 24-25 which are dependent therefrom are patentable. Thus Applicant respectfully requests that the § 103(a) rejection of claims 23-25 be withdrawn.

CONCLUSION

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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Enclosure: Appendix

APPENDIX

version with markings to show changes made

IN THE CLAIMS

Claim 21 has been amended as follows:

21. (Amended) [The microwave plasma processing apparatus as claimed in claim 18,] A microwave plasma processing apparatus comprising:

a wavelength reducing member constructed and arranged to reduce a wavelength of a microwave transmitted therethrough;

a slot electrode guiding the microwave exiting the wavelength reducing member, the slot electrode provided adjacent to the wavelength reducing member;

a process chamber into which the microwave exiting the slot electrode is introduced so that a plasma is generated by the microwave within the process chamber;

a first temperature control device comprising:

a control unit;

a temperature sensor; and

a heater [wherein the heater comprises] comprising a heating wire wound on a fluid supply tube connected to a fluid passage in a temperature control plate to supply a fluid to the temperature control plate;

said first temperature control device being configured to control a temperature of at least one of the slot electrode and component parts including the wavelength reducing member provided in the vicinity of the slot electrode within a predetermined range of temperatures by heating at least one of the slot electrode and component parts including the wavelength reducing member above a lower temperature limit and cooling at least one of the slot electrode and component parts including the wavelength reducing member below a higher temperature limit.

End of Appendix